

Attachment K

NEXT GENERATION WIRELESS PUBLIC SAFETY NETWORK PROBLEM STATEMENT

EXECUTIVE SUMMARY

The public safety radio networks used by emergency workers in the Central Puget Sound region of King, Snohomish and Pierce Counties face significant changes and challenges in the near future. These challenges, if not met, will degrade service and will result in increased risks to the public and our first responders.

These networks dispatch police, fire, and emergency medical services. They enable first responders at an incident to coordinate their efforts; provide an officer who has just made a traffic stop with important information about the driver; and are used by responders to call for help when they need assistance. The coordination of our networks in our three-county Region has previously been identified as a national model.

Now, however, we face significant service degradation because of age, technical obsolescence, wear, and the planned withdrawal of vendor support. Because it takes six to ten years to complete a project of this size, we must act soon to address this upcoming degradation. If we don't, the result will be service outages and interruptions leading to delays in response times; greater difficulty in incident coordination; and increased danger to our police officers, fire fighters, paramedics, and other first responders.

Many agencies in Pierce, Snohomish, and King Counties (Region) frequently provide mutual assistance and engage in joint operations. To do this work, first responders must communicate and coordinate using these networks, no matter where the responders are physically located. Currently there is limited interoperability between all first responders within the Region due to disparate radio systems.

Some of the disparate systems within the Region will require significant upgrades or replacement to meet federal regulatory requirements, to replace obsolete technology, to accommodate population shifts, and to compensate for increased metropolitan building density. Current systems have demonstrated a lack of capacity for large scale events involving natural disasters or critical incident responses.

Public safety communication is no longer limited to voice communication. Police, Fire and EMS first responders need to receive a range of information in the field from their Dispatch Centers, their departments from other field units, or data bases. This information may be in the form of photographs, streaming video, reports, building plans, fingerprints or voice files. Likewise, they need to transmit similar information from their vehicles back to these locations. It is essential that our next generation network to carry these data for efficient service to the public and the safety of responders. A dedicated Public Safety Data Network will also increase the likelihood of data system availability and prioritization during major events which is not available through commercial data providers today.

Our Region has experienced a multitude of criminal incidents and enterprises which cross jurisdictional lines. Public Safety Answering Points (PSAPs) and dispatch centers which answer the 911 calls and collect information for dispatching are a key component in our interoperability response capabilities. Common information platforms such as Computer Aided Dispatch (CAD) and Record Management Systems (RMS) interconnectivity will enable information to flow freely and immediately across jurisdictional boundaries.

DETAILED PROBLEM STATEMENT

Introduction

Many agencies in Pierce, Snohomish, and King Counties (Region) frequently provide mutual assistance and engage in joint operations. To do this work, first responders must communicate and coordinate using the wireless systems where they are at the time. A coordinated and cooperatively designed system will increase our ability to quickly and efficiently respond to citizens' needs during any natural or manmade events in our three-county region.

The radio systems in the Region have one or more of the following problems:

- The equipment supplier for most of the networks in the Region has said it will stop repairing equipment and stop selling new equipment in the next few years.
 - Systems may face parts shortages, increasing the risk of service degradation.
 - Parts shortages may also limit agencies ability to add services.
- The system has insufficient capacity during a wide-scale emergency, such as the Nisqually earthquake.
- The system has insufficient capacity to support new services that would enable responders and other users to work more effectively and safely.
- The system does not adequately serve all of the populated areas in the three counties or projected growth areas.
- The system is old and maintenance costs are rising as parts increasingly require repair and replacement.
- Service often stops when a radio user enters a high- or mid-rise building.

As we move to the Next Generation Network, we can do so in phases or do the work throughout the Region at the same time. We must be sure that as our systems are upgraded or replaced, we maintain and improve interoperability (the ability to communicate and deliver needed services) among those agencies that are working together.

The Need to Improve Capacity

As the radio systems in the three-county area are upgraded or replaced, in-part or in-whole, it is crucial that as we upgrade/replace our systems, we maintain and improve the ability to communicate and deliver needed services across the region especially during major disasters. Current systems cannot guarantee that first responders can communicate at these times.

When there is a major disaster or event, many public radio system users reach for their radios or cell phones, overloading the system. For example, after the Nisqually earthquake, many King County 800 MHz radio users tried unsuccessfully to get on the radio system only to get a busy signal.

The problem was worse with many commercial services. Many responders use commercial cell phone services to provide part of their communication support. After the last earthquake, so many cell phone users tried to use their phones that these systems were even more overwhelmed than the radio systems. This reduced the effectiveness of first responders to coordinate emergency responses.

In addition, many first responders did not have access to wireless data networks that were available and unburdened during the Nisqually quake.

Finally, commercial providers do not provide the coverage and up-time consistently that first responders need to ensure communications are available during normal operating periods as well as major emergencies.

These problems have two sources and any upgrade/rebuild must address these problems:

- Current systems lack the capacity required for peak use times;
- There is no economic or regulatory incentive for commercial wireless providers to improve coverage and availability for first responders.

Systems should be rebuilt or upgraded so that for the first five years after the rebuild/upgrade, systems will meet or exceed the following measurements: during the normal busy hour each day, no more than one percent of calls attempted generate a busy tone and the average busy length will be less than one second. This means that under normal conditions, during the normal busy hour each day there should not be any more than 1% busies and a wait no longer than one second to get a permit-to-talk tone. Systems should be designed so that they can be further upgraded to meet these measurements throughout the systems' useful lives.

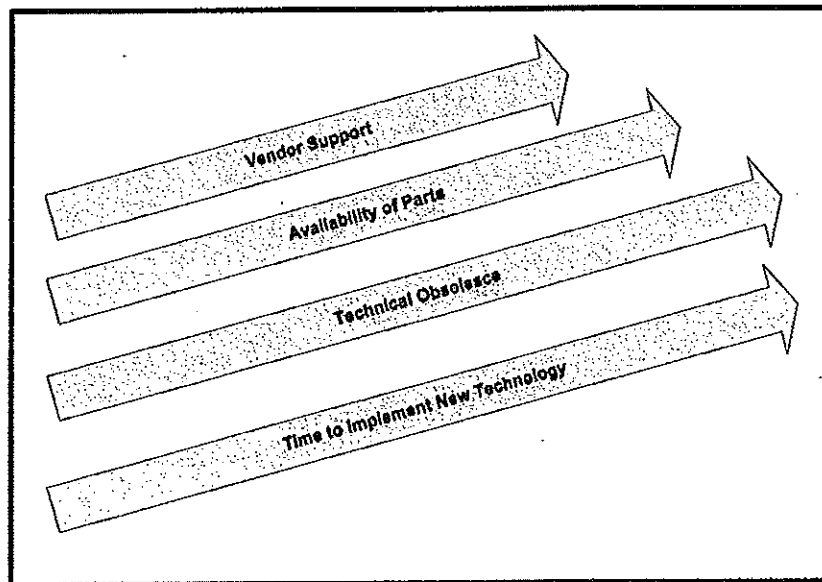
The End of Network Life

Snohomish and King Counties, the Port of Seattle and the cities of Tacoma/Puyallup have public safety trunked networks built by the same vendor using the same 1980s technology. These networks work reliably now but the technology is becoming obsolete. Not surprisingly, our vendor has indicated that it will stop manufacturing new parts and performing repairs on the used parts in these networks over the next several years. The risks that our networks will degrade due to component failure are rising significantly and we face increasing repair and maintenance costs. We need to begin the process to build the Next Generation Network now if we are to avoid these risks.

The intended benefits of a Next Generation integrated network will be realized, however, only if the equipment advances are accompanied by consistent, on-going, and timely training; there are few benefits from a system with improved services and functionality if the system's users are unable to use those services and functions or are unaware that they exist.

Portions of the King County network are wearing out. Finished in 1997, parts in the network are increasingly failing and need repair or replacement. At the same time, the equipment manufacturer for most of the current radio systems in Pierce, Snohomish, and King Counties has told us it will stop selling and repairing the parts for our systems in the next years. a new we face

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It takes many years to replace this type of network. When we built the King County network in the 1990's, it took five years from the time funding was approved until the network was fully operational. The SERS Network took seven years from funding to completion. Thus, we need to begin this planning several years in advance of deployment.

Most of the Region's systems use Motorola v. 4.1 controllers and other equipment. Motorola has ceased developing new software for v.4.1 controllers. It has told us it will stop selling new consoles, equipment needed to fill in the "holes" in coverage, and other equipment and repairing used v 4.1 equipment over a period of years. The early part of this process has begun and all support will end by January 1, 2019.

Motorola's move to the next generation of technology does not mean that any agency will be required to turn off its system at any specific date; rather, the ability to expand a system to fill in "holes" or compensate for population growth decreases over time. Also, the availability of spare parts and repairs will lessen over time resulting in an increased risk of system degradation and higher repair costs. Parts will likely need to be obtained on the secondary market. Newer systems should require fewer repairs than older systems, but all v. 4.1 systems will be impacted to a considerable degree.

The VHF systems in use by Pierce County and many smaller fire districts also face Federal Communications Commission (FCC) requirements to move to narrowband operations by 2013. This will require upgrading these systems. This requirement will be an opportunity to improve our interoperability within the region by bringing those agencies and users to a common platform.

Interoperability is not just a local issue, but also a nationwide problem. The U.S. Department of Homeland Security recently released a National Emergency Communications Plan which sets targets for emergency communications across multiple agencies and communities by 2010.

Geographical and In-Building Coverage

Several populated areas in the Region have little or no radio coverage, and the impact of this problem is likely to increase in all three counties as growth patterns change.

- **To work safely and effectively, responders and other users need systems that enable them to easily communicate in all of the places they do their jobs. This is currently not possible.** For example, the oldest system, the King County system, was built to cover the population centers in the County when it was designed in 1994; it was not designed to provide coverage in 100% of the County. The increase in high-rise buildings together with the increase and dispersal of population has resulted in an increase in the number of significant "holes" in coverage. Similarly, there are "holes" in the Pierce County system's coverage. As our populations grow and shift, we can expect additional holes to develop throughout the Region, unless we act to prevent that from happening.
- It will become more difficult to fill these holes as the supply of the needed equipment lessens. Our equipment supplier has indicated that it will end selling the current generation of equipment used to add sites (and thus expand coverage) in 2009.
- Population growth will also drive the need for additional responders and dispatchers. Again, our equipment supplier has told us that it will stop selling dispatcher consoles for use with v. 4.1 systems by the end of 2009.

In accordance with the U.S. Government's National Emergency Communications Policy our network should insure "that responders can communicate:

- As needed, on demand, and as authorized
- At all levels of government
- Across all disciplines."

There are places in the Region today where radio users may lose coverage when they enter high-rise buildings or basements to pursue a suspect, fight a fire, or aid a patient. Today's system was not designed to provide such coverage but the next generation system can remedy this situation. This makes it difficult for users inside these areas to coordinate activities or call for assistance, and for incident commanders outside these areas and responders inside these areas to communicate.

Interconnection of Disparate Systems

Snohomish and King Counties, the Port of Seattle and the Cities of Tacoma/Puyallup have public safety radio networks using 800 MHz frequencies, built by the same vendor and using the same version of technology. But, other agencies critical to the public safety of the region use different frequency bands and technologies that do not work optimally with these systems.

In addition to the existing 800 MHz System upgrades already mentioned as needed, the existing VHF and other interconnected legacy multiband systems need to be upgraded and expanded within the time frame of the National Emergency Communications Plan (NECP).

VHF, UHF, paging, and low band systems are important for parks, major utilities, and similar users. For example, the current VHF interconnect system, called MARS, is a legacy system but no less vital for communications with VHF users, particularly state agencies. We need to have a plan to create a link between these systems and more major systems. In a new configuration, consideration should be given to adding a suite of VHF I/O channels including DNR common, REDNET, VTAC and OSCCR, and Search and Rescue, all analog.

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We also need to consider interoperability with non-government systems. Several private businesses have radio systems where interconnection could be highly desirable including private ambulance companies, utilities such as Puget Sound Energy and telephone service providers, and Boeing.

Common Programming, Functions and Features

The existing systems enable users to communicate with other responders on the network when they travel to a new area, often with some difficulty, but do not allow them to also communicate with their home area. Radios are sometimes programmed differently by different jurisdictions although it is possible to program them the same way today. As a result, **users are uncertain what channel to use when they travel to a new area.** This would be remedied with the Next Generation System.

Ideally, the systems would operate as a single network for users wherever they travel in the Region where a signal is available. Users should be able to push-to-talk and easily communicate with anyone else on the system in the three-county area.

In the best of circumstances, users would retain all of their systems' features, such as user identification, emergency (EMR) buttons, busy signals, etc., when talking with responders from other agencies and jurisdictions. However, users must be able to talk with each other quickly and easily even if some of the secondary features are lost.

Initial, planning will include Pierce, Snohomish, and King Counties. The REPC and Subcommittees will develop their recommendations, however, so that additional jurisdictions may be added later, if they desire.

Services Other than Voice Radio

Our Next Generation systems must support important services they cannot currently support.

- Users are asking for new and enhanced services they believe will help them do their job more effectively and safely. Examples include the ability to transmit Amber Alert pictures and building plans to the field, and to encrypt sensitive communication to prevent its interception during transport.

We risk a potential decrease in the ability to communicate if we move to diverse technical platforms as we conduct these upgrades. Conversely, through a coordinated effort we can improve our interoperability, response to public safety needs, and safety for our first responders.

Features and functions could be added to upgraded/rebuilt systems enabling users to do their work more effectively and safely.

- The Next Generation 911 (NG911) system will have the ability to receive Amber Alert and suspect photographs, videos, vehicle collision notifications, medical reports, and other information, and could then distribute it to responders in the field over this network.
- Police units need to be able to send and receive information such as police reports, citation information, fingerprints, warrants, mug shots, photographs of missing persons and even streaming video. Tactical situations require the ability to access mapping information and government records and to be able to communicate with other entities in multi-jurisdictional incidents.
- Fire units need to be able to send and receive maps, hazardous material documentation, information on weather conditions to predict chemical plumes, and building and utility plans.
- Emergency Medical vehicles need to be able to send and receive patient records, and have real time access to relevant data bases.
- Benefits may also result from connecting other systems and/or agencies together. Automatic vehicle location systems and paging would enable the better deployment of personnel and equipment. The encryption of operational communications would decrease the likelihood that those communications would be intercepted by perpetrators and others.

Many of these features and functions can be deployed only on upgraded/rebuilt systems with data capabilities. Wireless data services provided through a commercial wireless card often do not provide the needed security and dependability public safety requires.

Wireless data systems dedicated for public safety use are in place around the country. Snohomish County is currently involved in pilot testing (proof of concept) such a system. This technology is needed throughout Pierce, King and Snohomish Counties.

Efficiency Improvements

The Next Generation Network may result in efficiencies.

- A coordinated and cooperatively designed system which includes voice, data, Computer Aided Dispatch and other technologies will increase our ability to quickly and efficiently respond to citizens' needs during any natural or manmade events in our three-county Region.
- There are at least five radio systems in the Region. Operational efficiencies may result from doing the upgrades/rebuilds in a certain way and from the consolidation of certain tasks. It may be possible to reduce the number of system switches in a Regional system, for example.
- Quantity discounts might also be available if we purchase equipment or services as a Region rather than as individual systems.